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Transmitted herewith for filing is the patent application of

Inventor: Gregory B. Arnold and Dennis S. Prows

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For: PORTABLE PRINTER AND DATA ENTRY DEVICE ASSEMBLY

Enclosed are: Patent application - 11 pages including 10 claims, Abstract, and Declaration, 2 sheets formal drawings

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Attorney of Record

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Docket M-617

## PORTABLE PRINTER AND DATA ENTRY DEVICE ASSEMBLY

### Background of the Invention

#### Field of the Invention

This invention relates to the fields of portable printers and portable data entry devices.

#### Brief Description of the Prior Art

The following prior art is made of record: U.S. patents 5,486,259 and 5,483,624; Symbol Technologies, Inc. manual entitled SPT 1500, pages 1 through 20, Copyright 1998; Symbol Technologies, Inc. internet site, Product Information, SPT 1500 Palm Terminal Series, pages 1 through 3, 3/23/99; Axiohm Thermal Printer Mechanism, User's Manual THTP Series, Preliminary Issue, reference 3104660-FDE, October 1998.

#### Summary of the Invention

The invention relates to a portable printer which can be coupled to a portable data entity device, and when so coupled the combination is a

portable assembly which in general can be conveniently carried from place-to-place and which in particular is hand held.

The invention relates to an improved lightweight, portable, hand-held, user-friendly printer for reception of a lightweight, portable hand-held, user-friendly data entry device, and to a combination of such a printer and such a data entry device.

A specific embodiment of the printer includes an elongate hand-held housing having a front portion which has a compartment or pocket for receiving a data entry device. The housing also has a rear portion. There is space at the rear portion for receiving a roll of a label web. A print module or mechanism is disposed at the rear portion for printing on the label web, and the print module including a thermal print head and a platen roll cooperable with the print head. It is preferred that the housing compartment have an open top for access to the data entry device. The platen roll is preferably mounted on a cover for an access opening to the label roll space. A set of batteries and the print module are preferably mounted on an elongate circuit board disposed in the printer housing. The batteries are preferably located at the front portion of the printer housing. The compartment is preferably open-fronted and is channel-shaped for slidably receiving the data entry device.

Brief Description of the Diagrammatic Drawings

FIGURE 1 is a perspective view of an assembly of a portable printer and portable data entry device, which is hand-held and portable, showing the portable data entry device scanning a bar-coded label;

FIGURE 2 is a partly exploded perspective view of the portable printer and the portable data entry device separated and with the cover open;

FIGURE 3 is a generally vertical sectional view of the assembly shown in FIGURE 1;

FIGURE 4 is a perspective view of a printed circuit board of the printer with batteries and a print module shown mounted thereon;

FIGURE 5 is an elevational view of one of the two mirror-image housing sections;

FIGURE 6 is a fragmentary sectional view illustrating the channel shape of the compartment for receiving the portable data entry device; and

FIGURE 7 is a fragmentary perspective view of the print module and the cover and the platen roll mounted by the cover.

Detailed Description of the Preferred Embodiment

With reference to FIGURE 1, there is shown an assembly generally indicated at 10 of a portable printer generally indicated at 11 and a portable data entry device generally indicated at 12. The printer 11 and the device 12, individually, as well as the assembly 10 are portable and in particular are hand-held for ease of use. The device 12 includes a scanner 13 at its front end for scanning a bar-coded label L. The device 12 also has manually operable keys 14 and a display 15. The scanner 13, the keys 14 and the display 15 are housed in an elongate relatively thin housing 16. Manually depressing buttons 14' operates the scanner 13.

The printer 11 is shown to have an elongate housing 17 having opposed mirror-image housing sections 18 and 19. The front portion of the housing 17 has a compartment or space or pocket 20 for receiving and releasably holding the data entry device 12. The compartment 20 has an open top 21 to enable the keys to be operated and to enable the display 15 to be seen. The compartment 20 is channel-shaped as diagrammatically depicted in FIGURE 6 to capture the data entry device 12. As shown, the housing 17 has flanges 22 and 23 which help retain the device 12 captive in the compartment 20. The front end of the compartment 20 is open as indicated at 24 to enable the device 12 to be slid into the compartment 20.

The device 12 is releasably latched in the compartment 20 by opposed latches 25. The latches 25 are each comprised of a pad 26 flexibly secured to a wall 27. The pads 26 have opposed projections 28 which are received in recesses 29 in the housing 16 of the device 12. By simultaneously depressing both pads 26 rearwardly of the wall 27, the projections 28 are withdrawn from the recesses 29 which allows the device 12 to be slid out of the compartment 20.

The underside of the device 12 has a 10-pin connector 30 which cooperates with a mating 10-pin connector 31 on the housing 17. As the device 12 is slid into the compartment 20 in the direction of arrow A in FIGURE 2, the connector 30 at the rear end of the device 12 connects with the connector 31 at the rear end of the compartment 20, thereby enabling the data entry device 12 to control the printer 11. The latches 25 are latched when the connectors 30 and 31 are connected.

As is apparent from FIGURE 3, the underside of the printer housing 17 has a hollow or concave surface 32 for receiving the palm of the user's hand. A strap 33 can fit about the back of the user's hand. The strap 33 can be a continuous loop of a hand as shown in FIGURE 3. FIGURE 3 also shows the device 12 diagrammatically and that a label roll R and a prior art print module or print mechanism generally indicated at 34 are disposed at a rear portion of the printer 11. The label roll R is illustrated as being comprised of a label web (or a web of labels) W received in space 35 in the housing 17. The roll R is suitably supported either at its central opening 36 or simply in a cradle 37 as shown. The web W passes from the roll R between a thermal print head 38 and a platen roll 39. The printed label web W exits the housing 17 at a slot 40 one side of which is formed by a tear edge 41.

FIGURE 7 shows that the print module 34 comprises a frame 42 which has sockets 43 and 44. The module 34 includes a platen roll 45

having a shaft 46. The shaft 46 is releasably held in the sockets 43 and 44 in the FIGURE 3 position. The module 34 further includes an electric motor 47 and gearing generally indicated at 48. The gearing 48 includes gear 49 on the shaft 46. Springs 50 which bear against a support 51 resiliently mount the print head 38.

The platen roll 45 is rotatably mounted to a cover 52. In particular, the shaft 46 passes through a flange 53 and is removably received in a C-shaped cutout 54 in a flange 55. The end of the cover 52 opposite the platen 45 has a pair of outwardly extending projections 56 for receipt in opposed recesses 57 in the housing sections 18 and 19. Accordingly, the cover 52 is pivotally mounted for movement between a closed or operating position shown in FIGURES 1 and 3 and an open or non-operating position as illustrated in FIGURE 2. It is apparent when the cover 52 is in the position shown in FIGURE 2, a label roll R can be readily inserted into the space 35. If the roll R has a core C as shown the core can be readily removed. Also, the print head 38 and the platen roll 39 can be readily cleaned when the cover is in the open position. If required, the platen roll 45, its shaft 46 and its gear 49 can be readily replaced by snapping the portion of the shaft 46 between the flanges 55 and the gear 49 out of the socket 44, and pulling the other end of the shaft 46 out of the hole in the flange 53.

As best shown in FIGURE 4, the print module 34 and upstanding battery contacts 58 are mounted on a printed circuit board 59. The connector 31 is connected to the printed circuit board 59 via conductors 31'. A ribbon connector 60 connects the print head module 34, particularly the motor 47, the print head 38 and sensors (not shown) to the printed circuit board via a connector 61. There are four contacts 58 on each side of the printed circuit board 59 for releasable contact to four rechargeable batteries 62. The connector 31 which is mounted to a

support 63 is connected to the printed circuit board 59. A port 64 accessible from outside the housing 17 is connected to the printed circuit board 59. The batteries 62 are held in a holder generally indicated at 64 which holds the batteries 62 in position but keep the batteries 62 from touching each other. The holder 64 maintains the batteries 62 aligned with opposed pairs of contacts 58. The holder 64 surrounds the outsides of all the batteries 62 as best shown in FIGURE 4. The holder 64 has fin-like separators 65 joined to a peripheral wall 66 and to a bottom wall 67 (FIGURE 3) The bottom wall 67 is connected to the printed circuit board 59 by integrally molded pins 68. The holder 64 is particularly beneficial in the event the assembly 10 or the printer 11 is dropped or otherwise impacted.

The printed circuit board 59 is captive between the housing sections 18 and 19 in transverse slots 69 and 70. The support 63 is received in slots 71 and 72. The housing sections 18 and 19 are connected by screws (not shown) received in aligned holes 74.

Floor 75 of the compartment 20 is provided with an access opening 76 which is closed off by a cover 77. The door 77 is pivotally mounted about a hinge axis 78 for movement between the closed position shown in FIGURE 2 and an open position to provide access for loading and removing the batteries 24. The cover 77 is releasably held in the closed position by a releasable latch 78'.

The printer 11 is compact, by way of example not limitation, one embodiment of the printer 11 has a length of about 8.31 inches (211 mm), a height 2.38 inches (60mm), a width of 3.38 inches (86 mm) and a weight of 0.9 pound (0.4 kg.); and the data entry device 12 has a length of 5.46 inches (140 mm), a height of 0.66 inch (17 mm), a width of 3.16 inches (81 mm), and a weight of 6.1 ounces (0.17 kg),

Other embodiments and modifications of the invention will suggest themselves to those skilled in the art, and all such of these as come within the spirit of this invention are included within its scope as best defined by the appended claims.

1. In combination: a portable printer and a portable data entry device removably connected thereto, the portable data entry device including a scanner for scanning bar codes and an elongate data entry device housing for the scanner, the portable printer including an elongate printer housing having a front portion with a compartment for receiving the portable data entry device, the printer housing having a rear portion, the printer housing providing space at the rear portion for receiving a roll of a label web, a print module disposed at the rear portion of the printer housing, and the print module including a thermal print head and a platen roll cooperable with the print head for printing on the label web.

2. In combination: a portable printer and a portable data entry device connected thereto, the portable data entry device including an elongate data entry device housing, a bar code scanner for scanning bar codes, a display and a plurality of manually operable keys, the portable printer including an elongate printer housing having a front portion with a compartment open at the front for receiving the portable data entry device, the compartment having an open top for access to the display and the keys, the printer housing further having a rear portion, the printer housing providing space at the rear portion for receiving a roll of a label web, a print module disposed at the rear portion of the printer housing, and the print module including a thermal print head and a platen roll cooperable with the print head for printing on the label web.

3. A combination as defined in claim 2, wherein the compartment is channel-shaped and the data entry device is slidably received in the compartment.

4. A portable printer, comprising: an elongate housing having a front portion with a compartment adapted to receive a data entry device, the housing further having a rear portion, the housing providing space at the rear portion for receiving a roll of a label web, a print module

disposed at the rear portion for printing on the label web, and the print module in including a thermal print head and a platen roll cooperable with the print head for printing on the label web.

5. A portable printer as defined in claim 4, wherein the compartment has an open top.

6. A portable printer, comprising: an elongate housing having a front portion with a compartment adapted to receive a data entry device, the compartment having an open top, the housing further having a rear portion, the housing providing space at the rear portion for receiving a label roll of a label web, a print mechanism disposed at the rear portion for printing on the label web, the print mechanism including a thermal print head and a platen roll cooperable with the print head for printing on the label web, an access opening for the label roll space, an openable pivotally mounted cover for the access opening, and the platen roll being rotatably mounted on the cover.

7. A portable printer, comprising: an elongate housing having a front portion with a compartment adapted to receive a data entry device, the compartment having an open top, the housing further having a rear portion, the housing providing space at the rear portion for receiving a roll of a label web, a print mechanism disposed at the rear portion for printing on the label web, the print mechanism including a thermal print head and a platen roll cooperable with the print head for printing on the label web, and at least one battery disposed at the front portion for powering the print head.

8. A portable printer, comprising: an elongate housing having a front portion with a compartment adapted to receive a data entry device, the housing further having a rear portion, the housing providing space at the rear portion for receiving a roll of a label web, an elongate printed circuit board disposed in the housing, at least one battery on the printed

circuit board at the front portion of the housing, a print module mounted to the circuit board at the rear portion of the housing, and the print module including a thermal print head and a platen roll cooperable with the print head for printing on the label web.

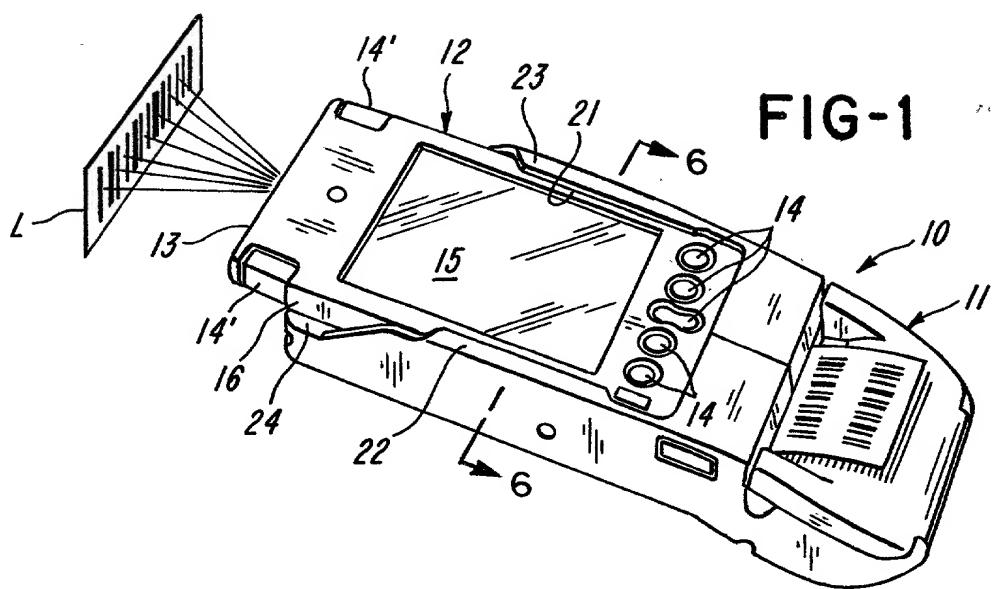
9. A portable printer as defined in claim 8, wherein the compartment has an open top and an open front end, the compartment being transversely channel-shaped, an electrical connector at the rear end of the compartment for connection to a data entry device.

10. A portable printer as defined in claim 9, wherein there are a plurality of adjacent batteries, a separator between each pair of adjacent batteries, and the separators being secured to the printed circuit board.

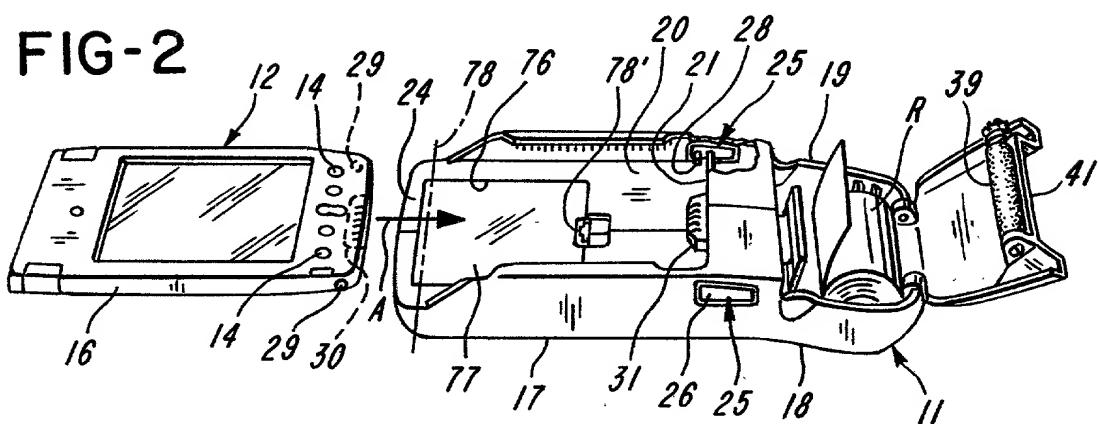
Abstract of the Disclosure

There is disclosed an assembly of a portable data entry device and a portable printer. The printer is hand-held and carries the data entry device. The data entry device includes a scanner and is located at the front portion of the printer. The printer has a space for accommodating a label roll and a print module which are located at the rear portion of the printer.

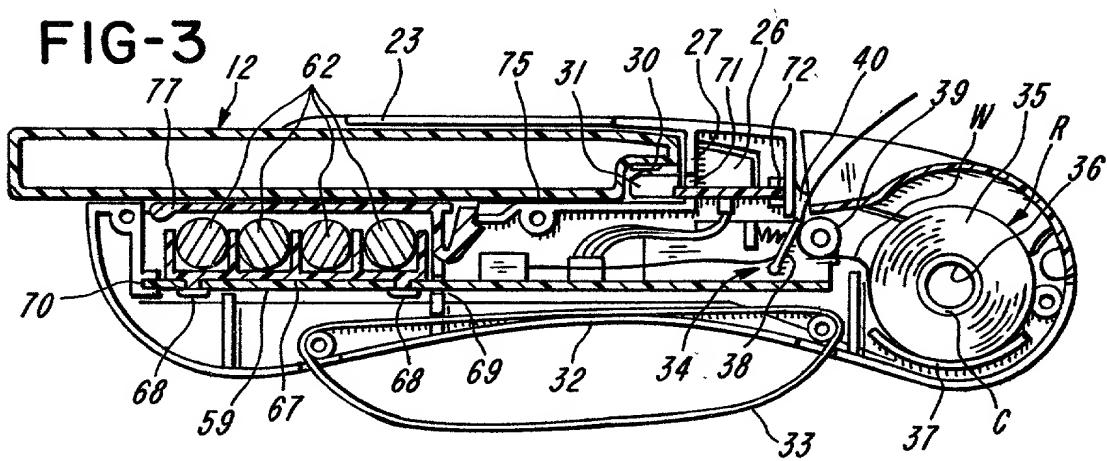
**FIG-1**



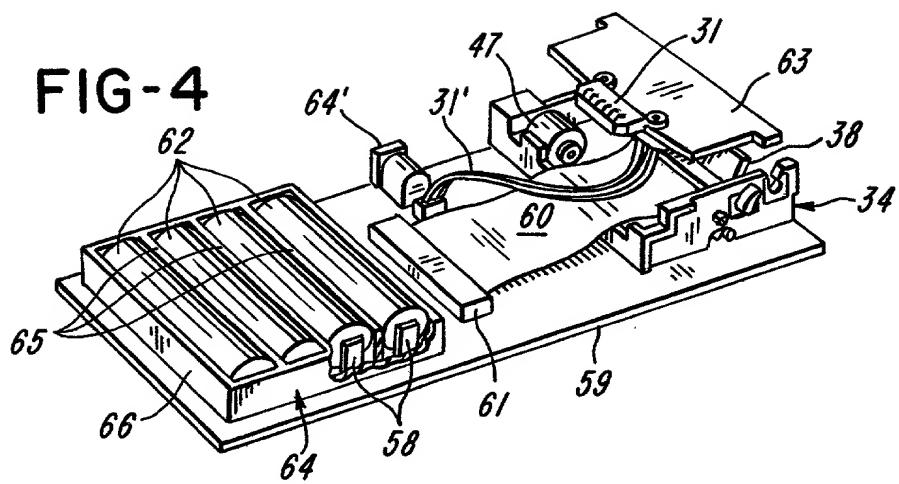
**FIG-2**



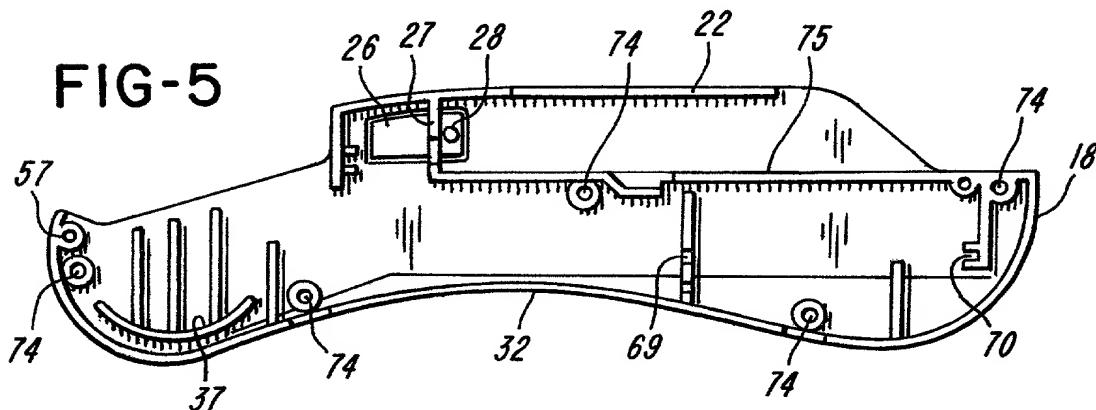
**FIG-3**



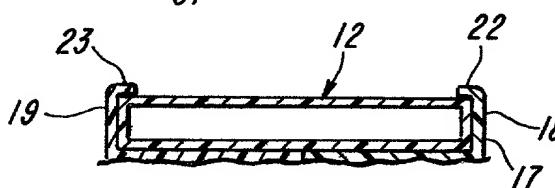
**FIG-4**



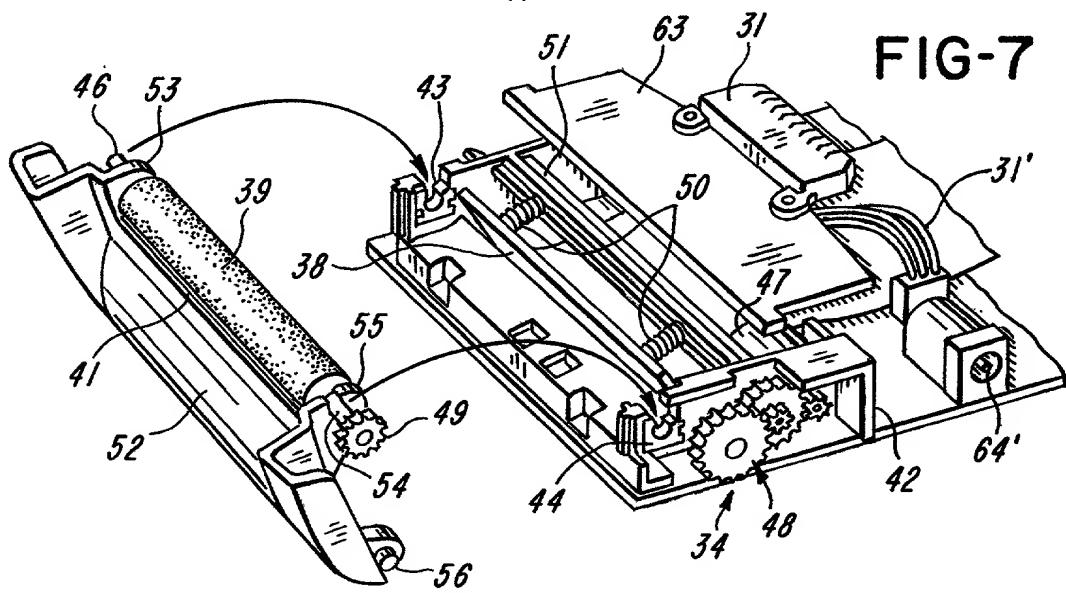
**FIG-5**



**FIG-6**



**FIG-7**



Declaration For Patent Application

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled PORTABLE PRINTER AND DATA ENTRY DEVICE ASSEMBLY (Docket M-617), the specification of which

(check  is attached hereto.  
one)

was filed on \_\_\_\_\_ as  
Application Serial No. \_\_\_\_\_  
and was amended on \_\_\_\_\_  
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

D

I hereby appoint JOSEPH J. GRASS, Reg. No. 19,768, telephone 513-865-2012, whose address is MONARCH MARKING SYSTEMS, INC., P.O. Box 608, Dayton, Ohio 45401, my attorney with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith.

S

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
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(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Gregory B. Arnold  
Inventor's signature G. B. Arnold

August 27, 1999  
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(Supply similar information and signature for third and subsequent joint inventors.)